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ABSTRACT

Individually Guided Education (IGE) is a complex instructional system intended to enable the elementary school to provide an environment where students learn at a rate and in a manner appropriate to their learning styles. This descriptive study concerns the implementation of the Pre-Reading Skills Program (PRS) which was created to be compatible with the IGE system. PRS was developed to prevent reading failure by teaching children skills that are necessary for successful beginning reading. The five skills are Letter Order, Letter Orientation, Word Detail, Sound Matching, and Sound Blending. The program was carried out at three IGE schools. Data were collected through tests on general objectives of the program, observations, teacher logs, and interviews. Profiles by school on means of instruction (pacing, grouping, materials, and interactions), time use (allocated, available, and engaged time), and achievement provide a basis for discussing the relationships among variables. (Authors/CJ)

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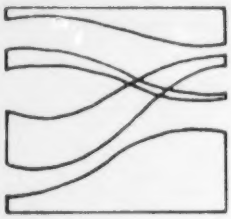

Technical Report No. 568

IGE Evaluation Phase IV: PRS Descriptive Study Final Report

by Deborah M. Stewart, Anne G. Nerenz, Norman L. Webb, and Thomas A. Romberg,

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Wisconsin Research and Development
Center for Individualized Schooling

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PRS DESCRIPTIVE STUDY FINAL REPORT

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Report from the Project on
Evaluation of Practices in Individualized Schooling

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- conducting and synthesizing research to clarify the processes of school-age children's learning and development
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- developing and demonstrating improved instructional strategies, processes, and materials for students, teachers, and school administrators
- providing assistance to educators which helps transfer the outcomes of research and development to improved practice in local schools and teacher education institutions

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Abstract

This report is part of Phase IV of the IGE Evaluation carried out by the Wisconsin Research and Development Center for Individualized Schooling. IGE (Individually Guided Education) is a complex educational system intended to enable the elementary school to provide an environment where students learn at a rate and in a manner appropriate to their own learning styles. Phase IV included five studies, three descriptive and two comparative. This descriptive study concerns the implementation of the Pre-Reading Skills Program (PRS) which was created at the R & D Center to be compatible with the IGE system. It was carried out at three IGE schools using PRS. Data were collected through tests on general objectives of the program, observations, teacher logs, and interviews. Profiles by school on means of instruction (pacing, grouping, materials, and interactions), time use (allocated, available, and engaged time), and achievement provide a basis for discussing the relationships among variables.

I

INTRODUCTION

This report describes one of five studies of R & D Center curriculum products conducted as part of an evaluation of Individually Guided Education (IGE). IGE, the evaluation project, and the curriculum product evaluation phase of that project are described in this section.

IGE and the Evaluation Project

Through the combined efforts of the Wisconsin Research and Development Center for Individualized Schooling, the University of Wisconsin IGE Teacher Education Project, the Kettering Foundation (I/D/E/A), and IGE coordinators in 25 states, more than 2,000 elementary schools have adopted a system called Individually Guided Education (IGE). This is a complex system based on theoretic and pragmatic ideas about schooling, children's learning, and the professional roles of school staffs. It was intended to influence elementary schooling in three general areas: organization, instruction, and intra- and interorganizational relations to provide:

> an environment in which the individual students learn at rates appropriate to each student and in a manner suitable to each student's learning style and other intellectual and personal characteristics.
> (Klausmeier, 1977, p. 7)

IGE has as its goals not only the instruction of students based on their individual level of achievement and learning styles, but also the development of particular types of organizational relationships within and outside of the school, and continuing research and evaluation.

Although much has been written about IGE as an alternative form of elementary schooling, no comprehensive picture now exists showing the manner in which IGE has been implemented in these schools. Thus, in order to gain a more detailed view of the day-to-day operation and overall effectiveness of the system as a whole, the IGE Evaluation Project was designed to identify features which contribute most to the success of reading skills and mathematics instruction as a result of individualized instruction (Romberg, 1976).

The evaluation project is comprised of five phases which were organized to provide complementary information on IGE. Phase I was a large sample study which provided basic information about IGE schooling. Phase II verified and extended the self-report data gathered in Phase I to include more fully the range of variables that determine the process of schooling. Phase III focused on the social meaning which emerges as IGE is used on a day-to-day basis. Phase IV, of which this report is one product, sought to determine the extent to which the three curricular programs developed for IGE met their objectives and to clarify the relationship of pupil outcomes to instructional time and means of instruction.

Finally, the goal of Phase V is to synthesize the results of Phases I through IV and address the significant issues in contemporary schooling raised by the project as a whole. Each phase of the evaluation was designed to complement and strengthen the validity of the data gathered by the previous phases. For example, data on means of instruction, gathered by the large-sample study of Phase I, are examined in somewhat greater depth in fewer schools by the Phase II studies. Phase III's analysis develops a view of instruction from a different perspective.

Phase IV explores means of instruction within the specific curricular areas of reading and mathematics. Instead of merely adding together summaries of the different evaluation phases, Phase V integrates and interprets the data from all the phases into a series of statements about what implications the project has for educational themes.

Overview of Phase IV

The intent of Phase IV was to describe in detail the actual operations of a sample of schools using curriculum materials designed to be compatible with IGE. Phase IV investigated three groups of variables--pupil outcomes, instructional time, and means of instruction--in IGE and non-IGE settings in which the Center's curriculum program as well as alternative curriculum materials were being used. Pupil attainment of program objectives is the dependent variable. The other two variables, instructional time and means of instruction, are essential in explaining and understanding how the programs work and how objectives are obtained. Instructional time was included because recent studies and reviews stress its importance and its relationship to pupil outcomes (Harnischfeger & Wiley, 1975; McDonald & Elias, 1976; Rosenshine, 1977). As Harnischfeger and Wiley state, "All influences on pupil achievement must be mediated through a pupil's active and passive pursuits" (p. 15). Instructional time and uses of instruction variables are also important from a practical point of view because they can be manipulated by teachers: Describing the use of each program in terms of allocated time, engaged time, and instructional activities provides concrete factors that teachers can manipulate in preparing and conducting instructional activities.

In sum, the primary purposes of Phase IV are:

1. to determine the degree to which the Wisconsin Design for Reading Skill Development (WDRSD) (Otto, 1977), Developing Mathematical Processes (DMP) (Romberg, 1977), and the Pre-Reading Skills program (PRS) (Venezky & Pittelman, 1977) meet their objectives and skills.

2. to determine how time is allocated for instruction in implementing WDRSD, DMP, and PRS.

3. to relate instructional time to the means of instruction and mastery of content for WDRSD, DMP, and PRS.

4. for each curriculum program, WDRSD and DMP, to contrast two situations--IGE schools using the program with non-IGE schools using the program and IGE schools using the program with IGE schools using alternative programs--on the variables of pupil outcomes, instructional time, and means of instruction.

Five studies were conducted as part of Phase IV, three descriptive studies and two comparative studies. The descriptive studies were small sample studies designed to describe how each of the three curriculum programs were being used in IGE schools. Each study was conducted during the spring semester 1978. Achievement monitoring and domain referenced tests, observations, teacher logs, and interviews were used to collect the data. These procedures were piloted for subsequent use in the comparative studies of DMP and WDRSD. The two comparative studies were conducted during the 1978-1979 school year. Three types of schools were included in these studies: (a) IGE schools using DMP or WDRSD; (b) non-IGE schools using DMP or WDRSD; and (c) IGE schools using alternative programs.

The PRS Program

"PRS, a prereading skills program, was developed to prevent reading failure by teaching children skills that are necessary for success in beginning reading" (Venezky, Pittelman, Kamm, & Leslie, 1974, Teacher's Guide Folder 1). Five skills, three visual and two sound, comprise the program. Letter Order (distinguishing no from on), Letter Orientation

(distinguishing b from d), and Word Detail (distinguishing take from tale) are the three visual skills. Sound Matching (recognizing the same sound at the beginning of cow and kite) and Sound Blending (making pat from the sounds /p/, /a/, and /t/) are the two sound skills. The program may be started at any time during the school year. The first lessons are only 10 minutes long so the program can begin on the first day of school; later lessons go up to 30 minutes in length.

The PRS program includes a variety of large group activities, small group games, and individual projects and practice sheets. This variety may be used solely to provide children with a range of learning experiences for each skill; having a number of activities in the classroom simultaneously is also necessary for maintaining different skill groups. The PRS Teacher's Guide encourages the formation of more than one skill group, but acknowledges the fact that not all teachers will conduct the program in that manner.

In the preferred schedule, PRS instruction is provided every day, alternating between sound and visual skills; the first five lessons are outlined in this manner. The recommended alternative is PRS instruction 3 days a week with a sound and a visual lesson each day. After the visual schedule has been completed, it is recommended that instruction in sound skills be provided 5 days a week. Checkpoints are provided in both the visual and sound schedules. These points indicate when to give the individually administered skills tests and provide directions for teachers who decide to form more than one skill group.

Overview of Remaining Sections

Data collection procedures, including information about the three participating schools, are described in the second section of this paper.

The third section includes a discussion of program implementation and the results of the instructional time analysis. Achievement results are also provided. The fourth section discusses results in relation to the three purposes of this descriptive study.

II

PROCEDURES

Duration of the Study

Pretesting for the study occurred during the week of February 27, 1978. For the following 9 weeks, from March 6 to May 12, teachers kept daily logs and classroom observations were made at least once a week during PRS instruction. Posttesting occurred during the week of May 15, 1978.

Sample

All three K-6 schools had been IGE schools since 1970 (schools 484 and 501) or 1971 (school 321). PRS had been used for 2 years at school 321 and for 4 years at the other two schools; school 484 had, in addition, participated in the field test of PRS materials prior to their publication in 1974.

School 321 is the only elementary school in a small town with a population less than 1,000. Its enrollment of nearly 400 students includes children from the surrounding rural area. Morning and afternoon kindergarten classes are taught in self-contained classrooms. Testing occurred in both classes. Log and observation data were collected only in the morning class.

School 484 is located in a medium-sized city with a population of approximately 57,500. About 700 students are enrolled. All three kindergarten classes, two morning and one afternoon, are taught in a self-contained classroom.

School 501 serves a primarily blue-collar neighborhood in the suburbs of a large metropolitan area. Slightly more than 400 students are

enrolled. All four kindergarten classes, two morning and two afternoon, are self-contained. All children were tested. Log and observation data were collected in one teacher's morning class and the other teacher's afternoon class.

Data were collected in participating schools with the cooperation of the teachers, principals, and students and under the direction of a local observer. These individuals were hired by the R & D Center to oversee the project at each school site. The observers conducted the interviews, administered tests, carried out observations, collected completed teacher logs, and served as liaison persons between the Phase IV staff and the school. Thus, the observers were crucial to the study. Each principal cooperated in selecting the observer for the local site. Observers came to Madison for 3 days of training for their role in the study. A description of the training is provided by Webb and Nerenz (1979).

Teacher Logs

For six randomly selected students at each of the three schools, teachers maintained daily logs of instruction. An alternate child was substituted if one of the six children left the school during the study.

Information recorded on the log form included time allocated for instruction, the content or program objectives covered, patterns of instructional grouping, and materials used. Detailed log data are provided by Nerenz (1979a); the rationale for and a description of the logging procedure are given by Webb (1979b).

Achievement

Group-administered tests were developed by the PRS staff for each of the five PRS skill areas. The tests are criterion-referenced, and results provide teachers with diagnostic information. Each test includes 16 items; 14 items correct (87.5%) is the recommended mastery criterion.

The PRS tests were administered as pretests during the week of February 27, 1978, and as posttests during the week of May 15, 1978. Both administrations were conducted by the PRS study observers who followed procedures recommended in the Administrator's Manual. At schools 484 and 501 all students took both pre- and posttests; at school 321 students mastering a skill on the pretest were not required to take the posttest for that skill.

Observations

Students for whom instructional logs were kept were also the target students for observations when physical conditions permitted. At school 484, logs were maintained for two children in a self-contained classroom and four children in a unit of children from kindergarten through grade 2; all observations were conducted in the unit. At school 321, six children were observed in each of the two classrooms; logs were kept for three of the six children observed in each class.

The behaviors of target students were recorded using time sampling procedures throughout the period allocated by the teacher to instruction in reading skills. The observer would watch a single target child for a few seconds and then describe the student's activities in terms of the observation categories. The total time for observing and recording was approximately 30 seconds. The observer would then repeat the procedure

for each of the remaining target students. Once one "moment" or "snapshot" had been obtained for all six target students, a 30-second period was devoted to describing the nontarget students using questions on the General Comment sheet. This entire procedure, termed a cycle, lasted about 3 1/2 minutes. Six cycles, or about 20 minutes of instructional time, could be recorded on one observation form. Data were gathered throughout the period allocated by the teacher to reading skills instruction.

Observation categories permitted either indication of activities not directly related to PRS or a description of PRS instruction and the target student's activities. An entry of absent or general content, which included both classroom management and instruction in other academic areas, could complete a snapshot. Six other categories were used in making a snapshot of PRS instruction: (a) specific content, the PRS skill for which instruction was observed; (b) pace, whether the target student was self-paced or working at the pace of a group; (c) grouping, whether the target was working alone, in a pair, in a small group of from three to eight students, or in a large group of more than eight students (group work requires interaction or a common pace rather than merely a similar task); (d) materials; (e) learner moves, whether the student was engaged in the instructional task, writing, speaking, or quietly attending, or if not engaged in carrying out a relevant interim activity, waiting for help, or simply off-task; and (f) verbal interaction, whether from the target to another student, an adult, or a group, or to the target as an individual or a group member from another student or an adult.

Detailed observation data are given by Nerenz (1979b). Webb (1979a) has described the rationale for the observation system.

Interviews

Structured interviews were conducted in February, March, and May with kindergarten teachers using PRS. In April, first-grade teachers in the three schools were interviewed; the reading specialist at one school was also interviewed.

III

Results

In this section, program implementation in the three schools is described. Data from the teacher logs and from classroom observations are presented to further define the use of instructional time and procedures in the three schools. Results of the group-administered tests are given; test results and instructional time for Sound Blending are discussed.

PRS Implementation at the Schools

At school 321, the first of the three in this study, there were two self-contained kindergarten classes. They each served 23 half-day children in addition to 3 students who were in both the morning and afternoon sessions. Of these 49 students, 46 were involved with the PRS program. Children who were not successful with the PRS program were retained in kindergarten, and at least one of the all-day students was attending kindergarten for the second time.

As recommended in the visual and sound schedules, instruction was provided on a daily basis beginning on the second day of school, with alternate days allocated to the visual and auditory skills. PRS was taught in small group settings for the first hour of class, followed by an hour of alternate activity and then another 40-minute period of large group PRS instruction. Instruction was usually provided by the teacher, although aides were available to help with the individual posttesting for approximately 45 minutes each week and to work with the children doing supplementary and makeup work as well as some planned games. While the review sections of the PRS program provided for nonmasters, Return to

Letter Order, Letter Orientation, and Word Detail, were used only for a small group of students who did not master the skills. The teacher noted that PRS and supplementary materials would also be used to reinforce the skills "according to an improvised plan." Generally, the PRS materials were not made available to the children during free play or other activity time because of difficulty in coding and reorganizing them. The Letter Order, Letter Orientation, and Word Detail tests were administered on what was termed an "ongoing" basis and these test results were used to "recycle" those children who did not master a particular skill. Other skills tests, in addition to achievement tests, were used to group children for first-grade instruction.

At the time of the first interview (February 27), both kindergarten classes at school 321 had completed all the visual skills and were working on rhyming activities in the Sound Schedule. By the time of the second interview (March 20), sound skills were taught only on days when the Phase IV observer was present. The teacher noted that, had she not been scheduling instruction with the study in mind, PRS instruction would have been provided each day and thus would have been completed that week. By mid-May, PRS instruction was given to individual students for 5 to 10 minutes, 3 times a week; instruction for the whole class was finished.

At school 484, PRS instruction was provided both in a primary unit (kindergarten, first, and second grade) and in self-contained morning and afternoon kindergarten classes. In the unit, PRS was taught for about 20 minutes, 4 days a week, with sound and visual skills presented in alternating blocks. In the self-contained kindergarten, instruction was scheduled for about 20 minutes every day at the beginning of the class

period, alternating sound skills with visual activities on a daily basis. By the time of the second interview, however, scheduling had changed so that complete units of sound and visual activities were alternated. In both the K-2 unit and the self-contained kindergarten, teachers followed the sound and visual schedule in sequence, although at each of the three interviews, students in the unit and in the self-contained classroom were at different points in the materials. The teachers expected to complete PRS instruction before the end of the year and intended to use all of the PRS posttests. Because an aide or parent volunteer was not generally available at the time of the first and second interviews, testing in the self-contained classroom was more difficult. However, at the time of the final interview a helper had been scheduled four mornings a week to test, record, and file materials.

At school 501, two teachers taught PRS beginning in the third week of school in the fall. Both had a self-contained morning and afternoon kindergarten session and used PRS for 15 to 20 minutes every day at the beginning of the period. Sound instruction was alternated with visual activities on a daily basis and all of the children in each session participated in PRS instruction. In addition, the kindergarten groups were combined twice a week and then grouped for instruction using WDRSD Word Attack materials. PRS materials were also available to students for use during their free time. Both teachers expected to complete the PRS program with a majority of the children and generally followed the sound and visual schedules in sequence. One teacher mentioned supplementing the visual skills and occasionally teaching activities out of sequence.

Allocated Time by Specific Content

A summary across all six children at each school of the time logged by teachers is shown in Table 1. In all three schools, over 60% of the time is allocated to the two sound skills. At school 484, all of the remaining time (34%) was allocated to visual skills. At schools 321 and 501, only 7% and 16% of the time was allocated to those skills with the remainder allocated to WDRSD Word Attack testing or instruction. A preliminary indication of the extent of individualization is provided by the number of children for whom time was allocated for each of the specific content areas.

Allocated, Available, and Engaged Time

Of the allocated time, identified by the teacher as time scheduled for PRS instruction, the time actually available for specific PRS content was identified through the observations. Averages for the total observation period, and percentages of allocated time spent on general content and available for specific content are shown for all three schools in Table 2. In schools 321 and 484, an average of 20 minutes of the instructional period was actually spent on instruction in PRS content. Allocated time was greater at school 321 but the additional 10 minutes were spent in general content. At school 501, available time was nearly double that in the other two schools due to the slightly greater allocated time and the distinctly smaller percentage of time spent in general content, 19% as opposed to 51% and 33%.

The child's activity, coded as learner moves, also affects the amount of learning time available. During time available for instruction, students were observed to be engaged or not engaged. A summary of engaged time at

Table 1

Instructional Time Allocated to PRS Skills

and to WDRSD Word Attack

Specific content	School 321			School 484			School 501		
	N	Minutes	%	N	Minutes	%	N	Minutes	%
Letter Order	1	4	.16	5	426	11.90	4	121	3.21
Letter Orientation	1	3	.12	5	166	4.64	6	197	5.23
Word Detail	6	170	6.93	6	628	17.55	6	290	7.70
Sound Matching	6	197	8.03	6	1,829	51.10	6	1,893	50.27
Sound Blending	6	1,301	53.04	5	530	14.81	6	654	17.37
WDRSD Word Attack	6	778	31.72	-	-	-	3	610	16.20
Total	-	2,453	100.00	-	3,579	100.00	-	3,765	100.00

Table 2

Average Daily Allocated and Available Time,

Engaged Time as Percentage of Available Time

	School 321[a]		School 484[b]		School 501[c]	
	Minutes	% of allocated time	Minutes	% of allocated time	Minutes	% of allocated time
Allocated time	41.6	100.0	31.5	100.0	48.1	100.0
General content	21.1	50.8	10.5	33.3	9.3	19.3
Available time (Specific content)	20.5	49.2	21.0	66.7	38.8	80.7

[a]During the 10-week study, 13 observations were conducted of from 4 to 84 minutes, with a median length of 37 minutes.

[b]During the 10-week study, 12 observations were conducted of from 22 to 42 minutes, with a median length of 29.5 minutes.

[c]During the 10-week study, 14 observations were conducted of from 9 to 53 minutes, with a median length of 20 minutes.

the three schools is given in Table 3. Engaged time was lowest at school 484 (56.6%), and was approximately two-thirds of the available time at both schools 321 and 501. Due to the greater amount of available time at school 501, students at that school had approximately double the engaged or active learning time as did students at the other two schools.

At school 484, students spent very little engaged time in writing and over 80% of their engaged time in covert activities (listening, thinking). A similar pattern was observed at school 321, where students spent about the same amount of time in covert activities; children spent the additional engaged time in writing. At school 501, only about 60% of the engaged time was spent in covert activities, with a greater percentage of engaged time spent writing and working orally than at the other two schools. Due to the greater number of minutes of engaged time at school 501, these students spent 1 1/2 times as much covertly engaged, 3 times as much orally engaged, and from 3 (school 321) to 10 (school 484) times as much engaged in writing.

The greatest proportion of nonengaged time at all schools was spent waiting. At school 501, students were off-task for a very small percentage of the time, compared to the other two schools. In schools 321 and 484, students were doing interim activities approximately 25% of the nonengaged time and were waiting approximately 60%; at school 501, however, wait time increased to over 80% with interim activities occupying less than 15% of the time.

Means of Instruction and Engaged Time

Information about pacing, grouping, materials in use, and interactions across the total observation period at all three schools is presented.

Table 3

Average Daily Engaged and Nonengaged Time by Category and Percentage of Available Time

Learner moves	School 321			School 484			School 501		
	Minutes	% of engaged time	% of available time	Minutes	% of engaged time	% of available time	Minutes	% of engaged time	% of available time
Engaged	13.2	100.0	64.6	11.9	100.0	56.6	25.9	100.0	66.7
Writing	1.7	12.8	8.3	.5	4.1	2.3	4.7	18.1	12.1
Oral	1.8	14.0	9.0	1.5	12.4	7.0	6.4	24.7	16.5
Covert	9.7	73.2	47.3	9.9	33.5	47.2	14.8	57.2	38.1
Nonengaged	7.3	100.0	35.4	9.1	100.0	43.4	12.9	100.0	33.3
Interim	1.6	22.7	8.0	2.4	26.5	11.5	1.8	14.1	4.7
Waiting	4.5	61.3	21.8	5.2	56.8	24.7	10.6	82.1	27.3
Off-task	1.1	16.0	5.6	1.5	16.6	7.2	.5	3.9	1.3

Note. Engaged time and nonengaged time are equal to available time.

For each variable, three pieces of information are provided in Table 4: number of minutes available on the average over all observations, percentage of available time, and percentage of available time children were engaged. The pacing and grouping categories take into account all of the available time; differences within these categories help to define different instructional patterns. For the materials and interaction categories, different instructional patterns are identified by differences within the category and by the total time.

Children were self-paced about 20% of the available time in all three schools. The percentage of time children were engaged in self-paced activities ranged from 41% at school 484 to over 75% at school 501, reflecting the overall engagement rates at the three schools. Rate of engagement in other-paced situations followed the same order across schools, but differed at each relative to engaged rate for self-paced situations. At school 321 the engagement rate was about the same for the two pacing variables; at school 484 engagement was higher for self-pacing than for other-pacing.

Distinct differences in grouping patterns were found among the three schools. Children worked individually about 20% of the available time at schools 321 and 501; at school 484, they worked individually over 15% of the available time and spent nearly that much time in small groups. Almost no small group work or pairs were observed at school 321. All grouping patterns were observed at schools 484 and 501.

At all schools, large group instruction was most common, about 70% of the available time at schools 484 and 501 and about 80% at school 321. Engagement rate was constant across grouping patterns at school 321,

Table 4

Average Daily Time Available and Engagement as a Percentage of Available Time for Means of Instruction and Interaction Variables

Variable	School 321 (13 observations)			School 484 (12 observations)			School 501 (14 observations)		
	Available time		Engaged % of available time	Available time		Engaged % of available time	Available time		Engaged % of available time
	minutes	%		minutes	%		minutes	%	
Pacing									
Self	3.8	18.7	62.7	3.7	17.5	40.8	8.5	21.9	76.3
Other	16.6	81.3	64.9	17.3	82.5	59.9	30.1	77.5	66.3
Grouping									
Individual	3.9	19.3	63.9	3.5	16.9	39.8	8.1	20.9	74.9
Pair	-	-	-	.4	1.8	35.2	1.0	2.7	76.2
Small group	.1	.7	66.7	2.8	15.3	77.5	1.1	2.9	90.9
Large group	16.4	80.1	64.6	14.2	68.0	57.2	28.5	73.4	65.4
Materials									
Games	1.5	7.4	82.3	5.1	24.5	59.0	2.4	6.2	47.9
Take-home	-	-	-	1.0	4.9	39.5	1.4	3.6	77.7
Paper-pencil	6.7	32.1	55.3	1.1	5.4	46.3	7.4	19.1	75.4
Printed materials	2.2	11.0	78.7	.4	1.9	70.7	3.5	9.1	60.2
Pocket chart	-	-	-	.0+	.2	100.0	-	-	-
Flannel board	-	-	-	-	-	-	.0+	.1	100.0
Chalkboard	-	-	-	.1	.5	100.0	.2	.5	74.5
Test	-	-	-	-	-	-	.2	.5	100.0
Other	.1	.7	100.0	-	-	-	1.8	4.7	82.1
Total materials use	10.5	51.2	64.8	7.7	37.4	56.0	16.9	43.8	69.7
Interaction									
Target ↔ Adult	.4	2.1	-	1.0	4.9	-	1.0	2.3	-
Target ↔ Other student	.0+	.2	-	.6	3.0	-	.0+	.1	-
Student ↔ Group	1.9	9.2	-	.1	.2	-	1.5	3.9	-
Adult ↔ Group	6.1	30.9	-	4.4	21.1	-	14.8	38.1	-
Total interaction	8.4	42.4	-	6.1	29.2	-	17.3	44.4	-

Note. Some time but less than .1 minute per day average is noted by .0+.

approximately two-thirds of the available time. At school 484, the engagement rate was greatest for small groups, less for large groups, and still less for individual and pair groupings. At school 501, the engagement rate was lowest for large group instruction. At all schools, engagement was highest for small group work.

At school 321, materials were used for a greater proportion of the available time than at other schools, 51% in contrast with 37% and 44%. There was also less variety in materials used at this school; only four types were observed with paper-and-pencil materials in use nearly one-third of the available time. At school 484, materials were used a smaller proportion of the available time, although six types were observed, with games in use nearly one-quarter of the available time. At school 501, the greatest variety of materials, eight types, was observed. Although paper-and-pencil materials were most frequently used, they were observed less than half of the overall time spent with materials. In each school, engagement was observed to be 100% for at least one material in use for a very brief period; specialized, focused instruction could be carried out very effectively by teachers at all three schools.

Interactions occurred less than 30% of the available time at school 484 and over 40% at schools 321 and 501. At all schools, the most frequent observation was of the teacher or another adult talking to the group. The relationship of adult to group interactions to the total time spent working in groups varied widely across schools: At school 321, the average 6.1 minutes of adult to group talk was 37% of the 16.5 minutes children were observed in small and large groups; at school 484, 29%; and at school 501, 50%.

Student Achievement

Results of test administration at both test times for all three schools are summarized in Table 5. Detailed results have been provided by Nerenz (1979c, d). For all three visual skills, average scores were above the recommended mastery level at test time 1 and, except at school 321, were at approximately the same level at test time 2. The pattern for Sound Matching (a sound skill) was similar; only for Sound Blending were the average scores at test time 1 below the mastery level and had sufficient variance so instructional activities could be shown to relate to achievement at test time 2.

Instructional Time and Achievement for Sound Blending

The difference in time allocated to instruction in Sound Blending at the three schools was given in Table 1. At school 321, the 1,301 minutes were allocated throughout the study; at schools 484 and 501, the 530 and 654 minutes, respectively, were allocated during the last 3 weeks of the study (Nerenz, 1979a). Because of differences among the three schools in available and engaged time (Tables 3 and 4), the active learning time for Sound Blending does not vary as much as allocated time. In Table 6, engaged time in minutes and as a percentage of available time is given first as it would be calculated from overall results (Tables 3 and 4), and second as it was observed for Sound Blending. For school 484, much less time was observed to be available for Sound Blending instruction than would have been predicted from the overall relationship of available to allocated time; the opposite was true for schools 321 and 501. In all three schools, observed engagement rate for Sound Blending was higher than the overall rate.

Table 5

Results of PRS Tests

Test and time[a]	School 321[b]					School 484					School 501				
	Number of students	Average		Range		Number of students	Average		Range		Number of students	Average		Range	
		Raw score	% correct	Low	High		Raw score	% correct	Low	High		Raw score	% correct	Low	High
Letter Order															
Test time 1	47	15.3	93.4	6	16	103	15.5	96.9	8	16	79	15.6	97.4	11	16
Test time 2	9	14.4	90.3	6	16	103	15.6	97.3	8	16	84	15.7	98.3	13	16
Letter Orientation															
Test time 1	47	15.2	94.8	6	16	103	15.4	96.4	9	16	79	15.3	95.8	5	16
Test time 2	9	14.7	91.7	6	16	103	15.8	98.9	12	16	84	14.9	92.9	10	16
Word Detail															
Test time 1	47	14.6	90.9	5	16	103	15.0	93.8	6	16	79	14.6	91.1	4	16
Test time 2	9	12.4	77.8	6	16	103	14.8	92.7	8	16	84	14.9	92.9	10	16
Sound Matching															
Test time 1	47	13.0	81.4	5	16	103	14.7	91.9	3	16	79	15.4	96.5	11	16
Test time 2	25	14.1	88.3	7	16	108	14.9	93.1	7	16	84	15.5	97.0	8	16
Sound Blending															
Test time 1	47	13.0	81.4	5	16	103	11.8	73.6	4	16	79	13.0	81.3	4	16
Test time 2	25	11.4	71.5	5	16	106	13.4	84.1	2	16	84	14.7	92.1	6	16

[a]Test time 1 was in February 1978 and test time 2 in May.

[b]At school 321, only students who had not mastered all skills, based on results of individual testing at the school, took the tests at test time 2.

Table 6

Calculated and Observed Engagement for Sound Blending

	School		
	321	484	501
Allocated minutes	1,302	530	654
Calculated from overall results			
Available minutes	640.1 (49.2)[a]	353.5 (66.7)	527.8 (80.7)
Engaged minutes	413.5 (64.6)[b]	200.1 (56.6)	352.0 (66.7)
Observed			
Available minutes	903.3 (69.4)[a]	205.0 (38.7)	628.8 (96.1)
Engaged minutes	665.2 (73.6)[b]	140.3 (68.5)	445.7 (70.9)

[a]Engaged percent of available time.

[b]Available percent of allocated time.

On the basis of time that students were observed to be engaged in instruction in Sound Blending, we would expect very little change in scores at school 484 and increases at schools 321 and 501. Average scores for all students listed (Table 5) increased about the same amount at schools 484 and 501, 1.68 and 1.73 points, respectively. Due to the testing procedures at school 321, the averages at that school were not useful for comparison.

To include school 321 in the consideration of time and achievement, and to relate engaged time to achievement more directly, scores were examined only for the children in each school who took the tests at both testing times and who were target students for the classroom observations. Six students at schools 321 and 484 and 11 students at school 501 met these conditions. Their scores and mastery status are shown in Table 7.

At school 484 where the least engaged time was observed, the average score increased 1.8 points, over 11% of the 16-item test; however, the only masters of Sound Blending at test time 2 were the two students who had been masters at test time 1. At school 321 where the most engaged time was observed, the average score rose only 1.1 points but two additional children mastered the skill. At school 501, the average score was quite high at test time 1 and rose 1.6 points to within 1 point of a perfect score; four nonmasters at test time 1 had mastered the skill at test time 2, while one child who scored 1 point lower at test time 2 lost mastery status. In terms of gain in average scores, the amount of engaged time did not seem to have a direct effect, in terms of increasing the number of children demonstrating skill mastery, the amount of engaged time was effective for Sound Blending.

Table 7

Sound Blending Test Results for Target Students Tested at Both Test Times

Student[a]	School 321		School 484		School 501	
	Test time 1	Test time 2	Test time 1	Test time 2	Test time 1	Test time 2
1	13/N[b]	16/M	16/M	16/M	12/N	12/N
2	16/M	16/M	7/N	6/N	16/M	16/M
3	16/M	14/M	9/N	12/N	15/M	16/M
4	7/N	14/M	14/M	15/M	14/M	13/N
5	8/N	8/N	5/N	6/N	12/N	15/M
6	7/N	6/N	8/N	13/N	15/M	16/M
7					8/N	15/M
8					15/M	15/M
9					16/M	16/M
10					13/N	15/M
11					11/M	16/M

[a]At schools 321 and 484, only six students took the tests at both test times and were target students for the classroom observations.

[b]Score/status which is either master or nonmaster.

With this procedure it is also possible to estimate the extent to which the target students are representative of the class. Comparison with the averages at test time 1 for all tested students in Table 5 shows that the target students at schools 321 and 484 had lower than average scores for their schools, while those at school 501 were similar to the total group average.

IV

CONCLUSIONS

Three purposes for this study were listed in Section I and, as paraphrased below, will be used to structure this section:

1. To determine the degree to which the PRS program meets its objectives;

2. To determine how time is allocated for instruction in PRS; and

3. To relate instructional time to the means of instruction and mastery of the PRS content.

A fourth interest in this section is staff responses to the program.

Meeting Program Objectives

As mentioned previously, PRS was designed to prevent reading failure by providing instruction in skills that are essential for success in reading. Both student achievement and teacher response are relevant.

By February the average scores on visual skills at all three schools were above the program's recommended mastery level. This high level of student achievement indicates that the children are indeed acquiring the skills. Both kindergarten and first-grade teachers at all three schools appreciated these program effects. They mentioned that children's visual scores had gone up, that the time needed for reading readiness had decreased, and that children were more comfortable with reading skills. First-grade teachers reported that many reading skills could be reviewed rather than taught and emphasis could be put on blending rather than on the more elementary material.

Time Allocation

The developers of PRS recommend that instruction alternate between visual and sound skills until visual skills have been completed, that separate skill groups be formed if possible, and that review activities be provided only for students who have not mastered a skill based on results of an individually administered test.

At the beginning of the study, teachers reported having passed Checkpoint 4 in the visual schedule, after which time instruction in visual skills should have been provided only to nonmasters of the skill. At school 484, all students were participating in PRS review activities for the visual skills; at the other two schools provision for review depended on the children's mastery status.

None of the teachers in this study reported forming separate skill groups. In each of the interviews, all students were said to be on the same page in the schedule. At school 321, where PRS instruction had begun on the second day of school, Sound Blending instruction was provided throughout the study, with review on other skills provided as well during the first 6 or 7 weeks.

At both schools 484 and 501, instruction in Sound Blending started much later, being offered to all observed students only in the ninth week of the study. At school 501, PRS instruction began the third week of school; the beginning date at school 484 is not known. Performance of students at schools 484 and 501 at test time 1 was better than that of students at school 321 (Table 5) except for Sound Blending. At schools

484 and 501, students' mastery of the other four skills was not recognized or not considered in the allocation of instructional time.

Relating Instructional Time and Achievement

In the previous section, it was shown that an increase in the number of students mastering Sound Blending occurred in schools 321 and 501, where engaged time for that skill was much higher than at school 484.

For schools 484 and 501, where time was allocated to all skills for four or more children (Table 1), test results (Table 5) generally indicate that the instruction led to increased average scores or raised the minimum score or both.

Due to the exclusion from the second testing of children at school 321 who had mastered all skills, the relationship of allocated time to achievement is not clear for that school. Some success is obvious, however, since at least one of the children obtained a perfect score at test time 2, and means for three of the five skills were above the recommended mastery level. But, the low scores remained low at the second test time, suggesting that review activities had not been scheduled for all children who needed them.

Staff Responses to the Program

Kindergarten teachers have been enthusiastic about the program and teachers who have taught reading to children previously instructed in PRS have shared their enthusiasm. Teachers at the three schools in this study are no different; they were very enthusiastic about the program, enjoyed teaching PRS, and believed that the children, parents, and first-grade teachers had all responded favorably to the implementation of the

program. The daily activities, the accessibility and attractiveness of materials, the thorough coverage of skills, and the quality of the materials for parents were listed as the major attractions of the program. Drawbacks were listed as not using letter names, not introducing more letters, lack of supplementary visual materials, and amount of time needed for individual assessment.

The first three of these reported drawbacks suggest that although kindergarten teachers found much of value in the PRS program, they wished it had another objective. In describing why letter-sound correspondences were limited to 14 in the PRS program, the developers acknowledged that children probably would forget specifics in the summer before first grade, but emphasized they probably would retain the basic principle of decoding. Developers also discussed the potential confusion with introducing letter names as well as letter-sound correspondences. It seems unlikely that the program objective of mastering essential prereading skills by all children, and the teachers' implicit objective of introducing more specifics can both be met in classrooms that do not have skill groups formed on the basis of children's instructional needs.

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